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THE MAMMALS OF TOM GREEN COUNTY, TEXAS

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Mammalian distributions in central Texas are not well known. With the exception of Coke County (Simpson and Maxwell, 1989), no comprehensive county surveys have been conducted in this part of Texas. Although the region was included in distribution maps published by Davis and Schmidly (1994) and Hall (1981), records reported are incidental and not the result of systematic collecting efforts.

DESCRIPTION OF TOM GREEN COUNTY

Tom Green County (Fig. 1) is located in west-central Texas between 31°05' and 31°42'N latitude and between 100°07' and 100°41'W longitude, with a panhandle extending 24 miles westward from the northwest corner of the county to 101°16'W. The county encompasses 989,440 acres (1,546 square miles) (Wiedenfeld and Flores, 1976).

The county is situated in an ecotonal region where the Edwards Plateau surrounds a westward extension of the Rolling Plains (Blair, 1950). There are three major physiographic regions present: floodplains, outwash plains, and limestone slopes and tablelands. The floodplains are associated with the Concho River and its tributaries. The most extensive outwash plain, Lipan Flat, covers a large area in the middle half of the eastern part

of the county, the majority of which is cultivated. The limestone slopes and tablelands cover the remainder of the county, between the floodplains and surrounding Lipan Flat. These areas are used mainly as rangelands because the shallow rocky soils are not easily cultivated.

The vegetation types of Tom Green County are shown in figure 2. The part of the county not cultivated or urbanized today presents the appearance of a brushland or shrubland. Mesquite (*Prosopis glandulosa*), juniper (*Juniperus pinchotii*), and associated woody plants dominate where in the previous century open savannahs and grasslands were more typical (Maxwell, 1979).

Tom Green County is within the boundary zone between the Subtropical Subhumid climate of central Texas, characterized by hot summers and dry winters, and the Subtropical Steppe climate which includes the region from the mid-Rio Grande Valley to the Pecos Valley, characterized by semi-arid to arid conditions. Large fluctuations in temperature are common. The mean monthly low temperature in January is 0°C. The mean monthly high temperature in July is 36°C. Mean annual precipitation is 51 cm (Larkin and Bomar, 1983).

Most of the mammals collected before 1987 do not include habitat information on specimen labels or in catalogs. Furthermore, the complex interdigitation

of geological, soil, and vegetation types in this county render impractical the determination of narrowly defined habitats from locality data for most specimens. For these reasons we choose to describe ecological distributions of Tom Green County mammals in terms of broadly defined habitats.

We recognize three principle native mammalian habitats in Tom Green County: (1) Moderately deep to deep-soiled floodplains and outwash plains support a mesquite brushland-mixed grassland (mesquite-grassland). Local density of mesquite and other brush species varies greatly in response to agricultural practices. (2) Shallow-soiled limestone hills, bluffs, and plateau uplands support a locally variable woody vegetation of juniper, plateau liveoak (*Quercus fusiformis*), and mesquite (juniper-liveoak upland). (3) Stream courses and adjacent floodplains support riparian woodlands, largely of pecan (*Carya illinoensis*), plateau liveoak, and

black willow (*Salix nigra*) where water quantity is sufficient, and hackberry (*Celtis* sp.), mesquite, and river walnut (*Juglans microcarpa*) where drier conditions prevail (riparian). Figures 3-7 depict typical mammalian habitats in Tom Green County.

METHODS AND MATERIALS

Although Tom Green County mammals have not until now been surveyed methodically, incidental and localized collections have been made over the past 30 years. Most specimens in the Angelo State Natural History Collection (ASNHC) taken prior to this study were collected on the Head of the River Ranch, located about 5 mi. south of Christoval, the ASU Management Instruction and Research Center (MIR), about 6.5 mi. northwest of San Angelo, and the S Ranch, about 10 mi. north of San Angelo. Other collection sites were

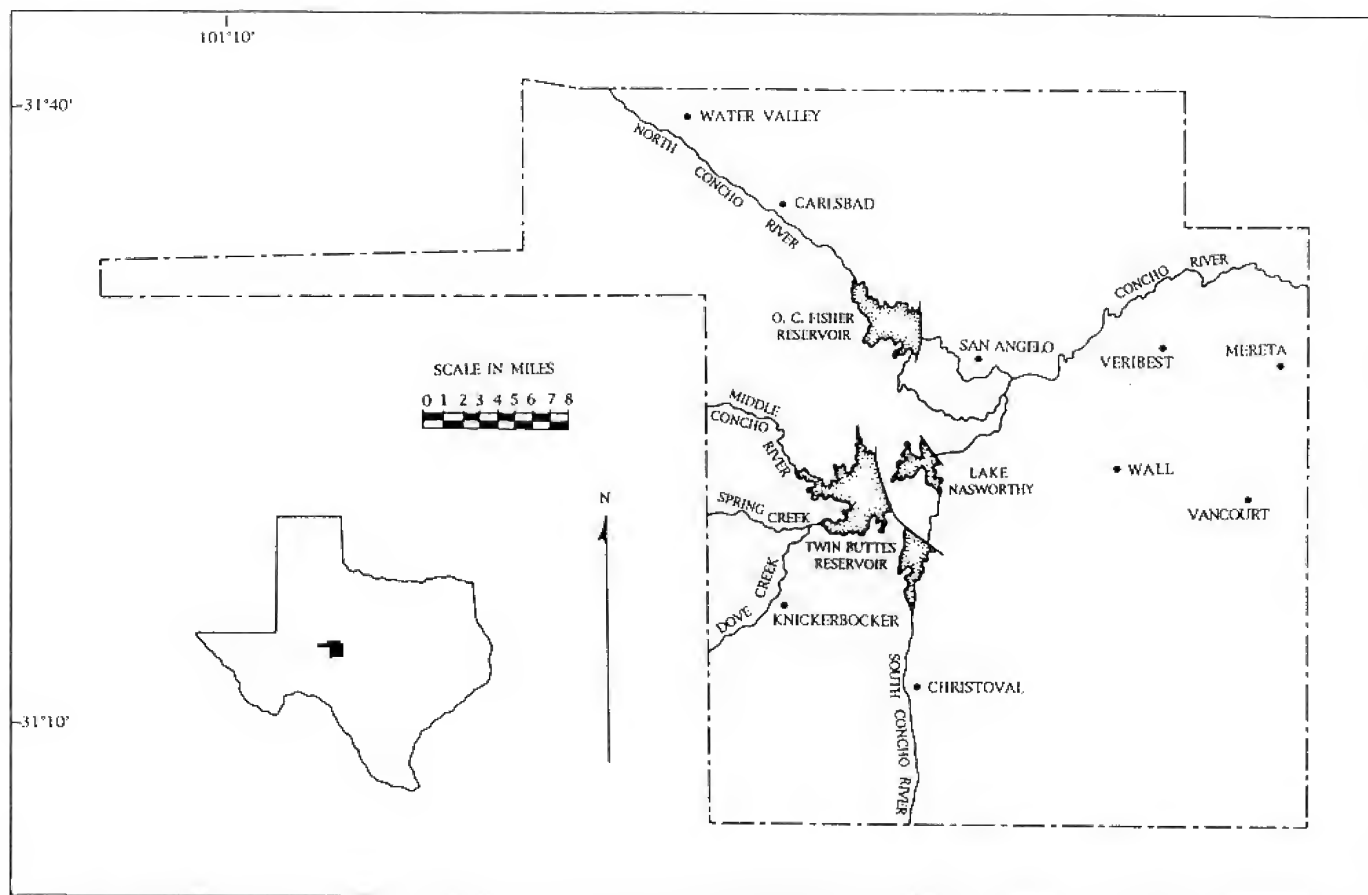


Fig. 1. Map of Tom Green County showing major streams and towns included in catalogued mammal specimen localities.

roadsides and fencelines, such as along U. S. Hwy 87 and Texas Hwy 277. Although field work in these areas continued throughout this investigation, our efforts were concentrated on areas that had not yet been sampled. Due to limited access, the panhandle was sampled in only one area.

Records of mammals from Tom Green and surrounding counties were requested from 23 mammal collections at universities and museums across the United States. Eighteen responded, some with no records from this or any adjoining county. During 1993, approximately 30 landowners in the county were asked to complete a survey that would indicate the status of some of the larger mammals on their properties within the county. The level of response was over 80 percent. See Boyd (1994) for species range maps and an example of the complete landowner survey.

The goal of this study was to obtain a sample of each mammal population at each site examined using standard techniques. Collection devices used include Sherman live traps (3x3x9 in.), Museum Special snap traps, Tomahawk live traps, pit traps, Macabee gopher traps, and nylon mist nets. Other sources, such as hunters and trappers, were used for the collection of many of the larger mammals, and animals killed on the roads were salvaged periodically. Specimens and observation locations also were obtained from the United States Department of Agriculture, Animal Damage Control (USDA, ADC) trappers. Additional specimens, not examined by us, are listed separately in the species accounts.

Most specimens collected in this study were prepared as standard study skins with skulls and/or skeletons; some were prepared as skulls or skeletons only. All were deposited in the ASHNC. Soft tissues from

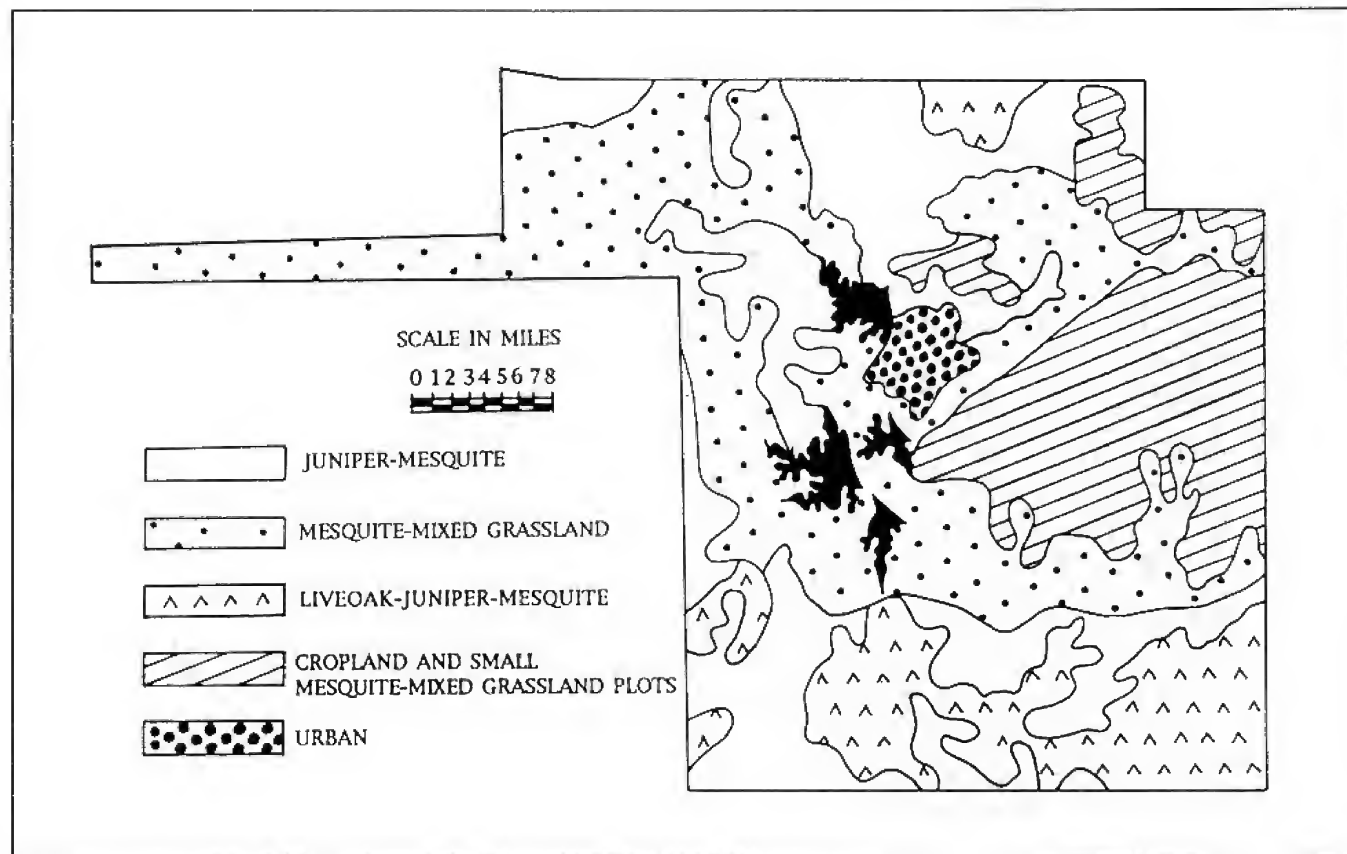


Fig. 2. Map of Tom Green County vegetation types; modified from Eckhardt (1975) and McMahan et al. (1984).



Fig. 3. Dense mesquite brushland in floodplain of the North Concho River.



Fig. 4. Light mesquite-mixed grassland near the South Concho River. This site demonstrates secondary succession following brush control measures.



Fig. 5. Juniper-mesquite savannah near the panhandle in the northwestern quadrant of the county.



Fig. 6. Dense live oak-juniper-mesquite brushland near the southern county line.



Fig. 7. Riparian forest of pecan at headwater of the South Concho River.

many specimens were deposited in the ASNHC collection of frozen tissues.

ACCOUNTS OF SPECIES

Eight orders and 19 families of mammals were found in this study. The following accounts treat 44 native and four introduced species of mammals that presently occur in Tom Green County. Of these, 17 are new county records. These species are designated by an asterisk before the name. Additionally, five species have been substantiated by specimens or historical accounts, but likely have been extirpated. We have standardized all localities by pinpointing them as near to the actual collection site as possible and recording N-S and E-W mileages from the nearest town. Most of the specimens examined are housed in the ASNHC. Additional records refer to other collections with Tom Green County specimens, including Midwestern State University Collection of Recent Mammals (MWSU); Museum of Vertebrate Zoology, University of California, Berkeley (MVZ); Strecker Museum, Baylor University (SM);

Texas Cooperative Wildlife Collection, Texas A & M University (TCWC); Texas Natural History Collection, Texas Memorial Museum, University of Texas at Austin (TNHC); Texas Wesleyan University (TWU); United States National Museum of Natural History (USNM); and the Museum of Texas Tech University (TTU). Phylogenetic order and scientific names, with few exceptions, follow Wilson and Reeder (1993). Species within the same genus are entered alphabetically. Vernacular names follow Jones and Jones (1992). All measurements of specimens are in millimeters.

Didelphis virginiana Kerr Virginia Opossum

Based on specimens in collections and sightings, the Virginia opossum is common in a variety of habitats in this county, including riparian woodlands, mesquite-grassland, cropland, and urban areas.

Specimens examined.—1 mi. N, 1 mi. W Christoval, 1; 5 mi. S Christoval, 2; 2 mi. SE Knickerbocker, 1; 12 mi. N, 6.5 mi. E San Angelo, 1;

8 mi. N, 6.8 mi. W San Angelo, 1; 4 mi. N, 5 mi. W San Angelo, 1; 2 mi. N, 3 mi. E San Angelo, 1; 6.8 mi. W San Angelo, 1; San Angelo, 8; 3 mi. S San Angelo, 1; 4.5 mi. S, 3 mi. W San Angelo, 1; 8.1 mi. S San Angelo, 1; 10.5 mi. S San Angelo, 1; 14.9 mi. S, 14.9 mi. W San Angelo, 1; 5 mi. S Water Valley, 1 (TTU).

**Dasypus novemcinctus* Linnaeus
Nine-banded Armadillo

Although the nine-banded armadillo frequently appears in other ecological communities, it is most common in riparian forests, such as those found along the banks of the Concho River and its tributaries. Schmidly (1983) suggested that areas with dense vegetation support a greater population of armadillos probably because there is a better food supply and also because any predators would have difficulty moving through dense, thorny brush, which does not hinder the armadillo itself. A population of *D. novemcinctus* on the Head of the River Ranch, about 5 mi. south of Christoval, was studied by Smith (1992). She reported that the density of armadillos in the study area (around Anson Springs and Cole Creek) was higher than others previously reported for most of Texas.

Specimens examined.— 4.3 mi. N, 1.2 mi. E Christoval, 1; Christoval, 2; 5 mi. S Christoval, 2; 12 mi. N San Angelo, 1 (TTU); 6.4 mi. N, 6.6 mi. W San Angelo, 1; 6.4 mi. N San Angelo, 1; San Angelo, 3; 7 mi. S San Angelo, 2; NW quadrant Tom Green County, 1.

Cryptotis parva (Say)
Least Shrew

Until recently, the least shrew was unknown from the west-central region of Texas. Maps by Davis and Schmidly (1994), Hall (1981), and Schmidly (1983) show the distributional limits of the least shrew in Texas to be 50 mi. northeast and 120 mi. east of this county. Dowler and Boyd (1996) reported three specimens from Tom Green County, extending the range of this shrew into the Concho Valley region. One male collected on 7 August had a testes length of 5.

Specimens examined.— 3 mi. N, 1.5 mi. W Mereta, 1; 3.3 mi. N, 3.6 mi. W San Angelo, 1; 1.5 mi. S, 3 mi. E San Angelo, 1.

**Notiosorex crawfordi* (Coues)
Desert Shrew

In Tom Green County, the desert shrew is found in association with a variety of vegetation types: mesquite-juniper brush, mesquite-juniper-live oak associations, and mesquite-mixed grassland. Because of the difficulty of capturing shrews, they may be more common within the county than is evident by the number of specimens.

Specimens examined.— 1.5 mi. W Christoval, 1; 4 mi. S Christoval, 2; 4 mi. N, 5 mi. W San Angelo, 4.

Lasionycteris noctivagans Le Conte
Silver-haired Bat

Texas records of the silver-haired bat, especially females, are uncommon. The species is widespread across northern North America and it has become evident that *L. noctivagans* is merely a fall-spring migrant in Texas (Davis and Schmidly, 1994). Dowler et al. (1992) reported four records of this bat from the Edwards Plateau, one of those being a male taken in San Angelo on 30 September 1974, the only record to-date of *L. noctivagans* from Tom Green County.

Specimens examined.— San Angelo, 1.

Lasiurus borealis (Muller)
Eastern Red Bat

The eastern red bat occurs throughout Texas, being particularly common in the eastern part of the state (Schmidly, 1991). It occurs within Tom Green County in riparian forest habitats and in those residential areas which provide them with dense cover of large trees. One specimen was salvaged from a backyard swimming pool in San Angelo (Yancey and Jones, 1996). All Tom Green County collections of this bat have been made between the months of May and October.

Specimens examined.— 4 mi. S Christoval, 4; San Angelo, 5; 1 mi. W Veribest, 1; 0.6 mi. S, 2.5 mi. W Water Valley, 4.

**Lasiurus cinereus* (Beauvois)

Hoary Bat

The hoary bat is found in all ecological regions across the state (Schmidly, 1991). Specimens have been taken in the southern two-thirds of Tom Green County in riparian woodlands and residential areas where large trees are present. This is a migratory species, with no captures or sightings being reported within this county during the winter months.

Schmidly (1991) reported that female *L. cinereus* can be expected to migrate through Texas in spring and fall, whereas males may remain from spring throughout the summer. Although the sample from this county is relatively small (8), the data are consistent with this pattern. The ASNHC has specimens of females collected from the end of March through the middle of May and again in October, whereas males have been collected only in August.

Specimens examined.— 4 mi. S Christoval, 2; 5 mi. S Christoval, 1; San Angelo, 2; 9 mi. S, 5 mi. W San Angelo, 1; 14.6 mi. S, 13.3 mi. W San Angelo, 2; 4 mi. N Wall, 1.

**Myotis velifer* (J. A. Allen)

Cave Myotis

Thirteen individuals of the cave myotis have been taken from various locations within the county, but like most other bats collected, most were caught in the wooded areas associated with rivers and streams. On several occasions, this species was found roosting with, but spatially segregated from Brazilian free-tailed bats (*Tadarida brasiliensis*) in a large colony under a highway overpass in San Angelo. Association between these species within a single roost has been reported previously (Davis and Schmidly, 1994).

Specimens examined.— 4 mi. S Christoval, 3; 5 mi. S Christoval, 2; San Angelo, 3; 0.6 mi. S, 2.5 mi. W Water Valley, 4; 1 mi. S Water Valley, 2.

Nycticeius humeralis (Rafinesque)

Evening Bat

The evening bat is a forest dweller common in eastern Texas (Schmidly, 1991). This bat was first recorded in Tom Green County on 24 September 1988 when one male was collected 5 mi. south of Christoval at a wooded site on Cole Creek (Dowler et al., 1992). A second specimen was taken near the first collection site on 22 May 1992. Previous to these specimen records, distributional information on this bat (Manning et al., 1987; Schmidly, 1991) placed it at least 110 mi. east and southeast of the Tom Green County site (Dowler et al., 1992). The female taken in May was carrying two fetuses (crown-rump length = 22), verifying the existence of a breeding population in Tom Green County.

Specimens examined.— 4.1 mi. S, 1.8 mi. E Christoval, 1; 5 mi. S Christoval, 1.

Pipistrellus hesperus (H. Allen)

Western Pipistrelle

The western pipistrelle, the smallest bat in North America, is typically found in the desert Southwest, especially in the mountain ranges and canyons of Trans-Pecos Texas, but is known also from scattered localities on the High Plains, Rolling Plains, and Edwards Plateau (Manning et al., 1987; Schmidly, 1991). Simpson and Maxwell (1989) reported one specimen from Coke County, just to the north of Tom Green County. They suggested that this species may be more common in that county than is evident. There is a male specimen known from Tom Green County, taken on 9 April 1973 (Dowler et al., 1992).

Specimens examined.— 4 mi. S, 6 mi. W San Angelo, 1.

Pipistrellus subflavus (F. Cuvier)

Eastern Pipistrelle

The eastern pipistrelle is a year-round resident most commonly found in eastern Texas (Schmidly, 1991), but it also has been taken in more western areas of the state (Blair, 1952; Manning et al., 1987; Yancey et al., 1995). Dowler et al. (1992) reported a solitary

female taken in Tom Green County from the campus of Angelo State University on 6 April 1982 and two specimens from Irion County, directly west of Tom Green County, collected on 8 February 1974 and 14 August 1974.

Specimens examined.—San Angelo, 1.

***Tadarida brasiliensis* (L. Geoffroy)
Brazilian Free-tailed Bat**

The Brazilian free-tailed bat is the most common bat in Texas (Schmidly, 1991). There are probably many small colonies within the county roosting in houses, barns, churches, schools, and other buildings, some of which are occupied or used by humans. There is a large colony (estimated at as many as 200,000 individuals) of *T. brasiliensis* that roosts under the Foster Road overpass at Loop 306 just south of San Angelo. At this location, *Myotis velifer* also was found roosting in small numbers. The presence of *T. brasiliensis* in Tom Green County apparently is seasonal, although sight records of individuals have been reported even for winter months. One of us (Maxwell) observed several of these bats emerging from a building on the ASU campus on 21 January 1993. The arrival of large numbers of Mexican free-tailed bats usually begins in early March and departure begins in October, continuing through early December. The ASNHC has Tom Green County specimens from every month except January and June.

Specimens examined.—5 mi. S Christoval, 3; San Angelo, 24; 3.5 mi. S, 1 mi. W San Angelo, 9.

Additional records.—Carlsbad, 2 (TCWC).

***Canis latrans* Say
Coyote**

The coyote is known from a variety of habitats within the county. Animal Damage Control has about 30 records of coyote sightings and captures in the Tom Green County area from 1983 to 1993. Seventeen of the landowners surveyed in 1993 indicated that they have seen coyotes on their property in at least the previous five years.

The coyote was at one time obviously abundant in this, as well as nearby, counties. In the early 1900's, animal trappers caught many coyotes (Bailey, 1918). At least 91 skulls (and some skins) of those trapped in Tom Green County in the years 1915 and 1916 were deposited in the USNM. Today, coyotes are not nearly so numerous in this county as they were at that time.

Specimens examined.—7 mi. NE San Angelo, 1; 12.5 mi. E San Angelo, 1.

Additional records (USNM).—Carlsbad, 4; 6 mi. NE Carlsbad, 1; 20 mi. E Christoval, 4; 5 mi. E Carlsbad, 3; 10 mi. E Carlsbad, 1; 10 mi. E Christoval, 2; 10 mi. SE Christoval, 3; 10 mi. NE Christoval, 1; Christoval, 4; Mereta, 1; San Angelo, 14; near San Angelo, 29; 8 mi. N San Angelo, 3; 15 mi. W San Angelo, 2; 25 mi. S San Angelo, 2; 20 mi. S San Angelo, 2; Water Valley, 17.

***Canis lupus* (Linnaeus)
Gray Wolf**

Hall (1981) indicated the existence of records of the gray wolf from areas east of Tom Green County (Jack and Llano counties) and to the west (Upton County and the Guadalupe Mountains in Culberson and Hudspeth Counties). Indeed, *C. lupus* is known from an archeological site in Tom Green County (South Concho River) in deposits culturally aged as within the last 700 years (Scott and Creel, 1990). Notson (1974) wrote, "the lobo or large grey wolf skulks over the prairie." Jones and Jones (1992) maintain that the gray wolf once occupied western Texas as far east as McLennan County, but that no residents remain in the state today.

***Urocyon cinereoargenteus* (Schreber)
Common Gray Fox**

Based on records from the ASNHC and landowner surveys (all of which indicated sightings of this animal within the previous year), the common gray fox is common in every vegetational community within Tom Green County, except the Lipan Flat area. One locality in which the gray fox is abundant is the MIR Center, 4 mi. N, 5 mi. W San Angelo. This area is dominated by large mesquite in dense thickets with an undergrowth of thick brush. Large populations of rodents near the MIR Cen-

ter make this ideal habitat for both fox species present in the county (*Urocyon cinereoargenteus*, *Vulpes vulpes*). In Tom Green County, the gray fox is the more abundant and widespread of the two species. Testes of a male taken on 14 October measured 15x10; those of a male collected on 31 January measured 31x19.

Bailey made no mention in his 1899 and 1918 journal notes of the common gray fox in this area of the state. Packard and Bowers (1970) suggested that gray foxes have become more abundant due to extensive coyote control programs carried out since the turn of the century. Fox populations seem to abound in areas where the coyote is no longer a great threat as either a competitor or predator.

Specimens examined.— Christoval, 1; 5 mi. S Christoval, 2; 7.5 mi. S, 8.5 mi. E Christoval, 1; 14.2 mi. N, 5 mi. W San Angelo, 1; 8 mi. N, 4 mi. E San Angelo, 1; 4 mi. N, 5 mi. W San Angelo, 6; San Angelo, 1; 3.25 mi. S, 5.5 mi. W San Angelo, 1; 9 mi. S, 5 mi. W San Angelo, 1; 9.5 mi. S, 12 mi. W San Angelo, 1; 9.5 mi. S, 10 mi. W San Angelo, 1; 23 mi. S, 8 mi. W San Angelo, 1; Tom Green Co., SW quadrant, 1.

Additional records.— 2 mi. S San Angelo, 1 (TNHC).

Vulpes vulpes (Linnaeus)

Red Fox

In Tom Green County, the red fox is found in the same areas and vegetational regions as the gray fox, *Urocyon cinereoargenteus*. Only three of the landowners surveyed replied that they had never seen a red fox on their property. To our knowledge, there are no specimens taken from the Lipan Flat area. Although they have been sighted in most areas of the county, ASNHC records suggest the red fox is less common than the gray fox. One pregnant female taken on 2 March from 4 mi. N, 4 mi. W San Angelo carried three fetuses (crown-rump length = 100).

Specimens examined.— 4 mi. N, 5 mi. W San Angelo, 4; 12.9 mi. W San Angelo, 1; 2.7 mi. S San Angelo, 1; 6 mi. S Water Valley, 1.

Puma concolor (Linnaeus)

Mountain Lion

Mountain lions are not confirmed by specimens in Tom Green County, but their presence is strongly indicated. Nine of the 25 landowners responding to the survey claimed some evidence of this cat's presence on their properties since 1983. Texas Parks and Wildlife Department files (Bill Russ, mountain lion coordinator, pers. comm.) contain 12 sighting reports for 1991-1994. The validity of these reports cannot be confirmed, except one in 1993 made by a game warden. These reports represent all regions but Lipan Flat. A Texas Parks and Wildlife Department survey (1983-1989) contained one lion mortality report for Tom Green County (Alexander and Cook, 1992) and Davis and Schmidly (1994) apparently incorporated that report in their determination of a Tom Green County specimen, but we have been unable to obtain details. More tangible evidence exists for two of the bordering counties. Engstrom and Maxwell (1988) provided details, including a photograph, of a male mountain lion (52.3 kg) killed by a deer hunter in November 1987 within 1.2 mi. of the western county line. Animal Damage Control has confirming evidence of two lions killed immediately north of the Tom Green-Coke County line, most recently a 125 lb. (56.7 kg) male in 1993. There is a photograph of this animal in the ASNHC.

Historical accounts of the species in the county are anecdotal and sketchy. Notson (1974) reported the killing of a lion inside the Fort Concho post sometime during the period of 1868-1872. He further wrote, "...puma, not very numerous, but still holding a place...". Bailey (1899, 1918) made no mention of them being in this or any adjoining county.

The available evidence supports the conclusion that mountain lions are increasing and becoming regular in occurrence in Tom Green and surrounding counties, a trend reflected statewide (Alexander and Cook, 1992).

Lynx rufus (Schreber)

Bobcat

Bobcats have been seen throughout the county. Thirteen out of 25 Tom Green County landowners indicated on the 1993 survey that they had seen bobcats on

their property in the last year. Animal Damage Control has a record of a bobcat killed on the Doorkey Ranch, approximately 4.5 mi. SE Christoval, on 4 February 1993. In July 1993, a bobcat was found dying near O. C. Fisher Reservoir at 2 mi. N, 5.5 mi. W San Angelo. This and one other account are of bobcats found in or near areas of dense mesquite thickets with brush undergrowth, vegetation typical of Concho River floodplains.

Bailey (1918) wrote in his accounts of the mammals of the San Angelo region, "bobcats are not so numerous as the coyotes but a few are caught by the trappers all over the area covered." Today, in Tom Green County, the bobcat appears to be more numerous. Although not common, it is widespread in the county.

Specimens examined.— 4 mi. N, 5 mi. W San Angelo, 1; 7 mi. N, 12 mi. E San Angelo, 1; 10 mi. S, 7.5 mi. E San Angelo, 1; Tom Green County, 1.

Additional records.— Carlsbad, 1 (TCWC); 15 mi. NE San Angelo, 1 (USNM); 12 mi. NE San Angelo, 1 (USNM); 15 mi. W San Angelo, 1 (USNM); San Angelo, 4 (USNM).

Conepatus mesoleucus (Lichtenstein)
Hog-nosed Skunk

The hog-nosed skunk may be more numerous in this county than is evident by the number of specimens available. They are not often trapped, but 15 of the landowners had seen this species on their lands in the year prior to the survey. We found no reports from the northwestern part of the county or from the Lipan Flat region. One nonsalvageable road-killed *C. mesoleucus* was found at 2.4 mi. S, 4 mi. E San Angelo.

The present distribution of the hog-nosed skunk in Texas has been documented by Manning et al. (1986). Bailey (1918) wrote of the hog-nosed skunk, "a few...are caught by the wolf trappers, but they are not so common as the long-tailed skunks." Manning et al. (1986) explained the relative lack of specimens of *C. mesoleucus* in museum collections by suggesting that they are less likely to be collected because of their tendencies to avoid immediate areas of human habitation and to occupy rough, rocky habitats. In contrast to this, one of us (Dowler) who lives in a residential area of

southwestern San Angelo, enjoyed occasional visits from one hog-nosed skunk which was able to avoid traps on several occasions. There is a photograph of this individual from 1993 on file in the ASNHC. Two specimens and several nonsalvageable animals killed on the roads in Coke County led Simpson and Maxwell (1989) to suggest that they occupy mesquite-grasslands as well as stony hill areas.

Specimens examined.— 5.4 mi. N Christoval, 1 (TTU); 14.7 mi. N, 6.3 mi. E San Angelo, 1; 12 mi. N, 5 mi. E San Angelo, 1; 10 mi. N, 5 mi. E San Angelo, 1; 9.6 mi. N, 4.4 mi. E San Angelo, 1; San Angelo, 1; 9 mi. S, 5 mi. W San Angelo, 1; 10 mi. S, 8.6 mi. W San Angelo, 1.

Additional records (USNM).— San Angelo, 1.

**Mephitis mephitis* (Schreber)
Striped Skunk

The striped skunk is generally quite common throughout the state (Davis, 1974; Schmidly, 1977, 1983), and in Tom Green County it is not unusual in any habitat. The majority of the landowners, in June 1993 indicated that striped skunks had been sighted on their properties within the past year. One pregnant female containing four fetuses (crown-rump length = 24) was collected on 31 March.

Specimens examined.— 3.5 mi. S, 0.4 mi. W Christoval, 1; 5 mi. S Christoval, 2; 4 mi. N, 5 mi. W San Angelo, 1; 1 mi. W San Angelo, 1; San Angelo, 2; 9 mi. S, 5 mi. W San Angelo, 1; 9.7 mi. S, 4.1 mi. W San Angelo, 1.

Additional records (USNM).— 12 mi. E Carlsbad, 1.

**Spilogale putorius* (Linnaeus)
Spotted Skunk

Species limits in spotted skunks are controversial. Although Wilson and Reeder (1993) recognize only one species in Texas, many (Jones et al., 1988, Jones et al., 1992, Davis and Schmidly, 1994) recognize two species. Under the latter arrangement, the western spotted

skunk (*S. gracilis*) is the form occurring in Tom Green County.

This skunk is apparently uncommon in the county as a whole. Only three landowners surveyed indicated they had seen these skunks on their property in the previous year, two in the last 10 years, and four had not seen one in more than 20 years. However, spotted skunks may be more frequent near the city of San Angelo than in rural areas. Four of the five county specimens are from the more densely human populated environs of the city of San Angelo, an association habit noted by Davis and Schmidly (1994).

Specimens examined.— 3.6 mi. N, 2.6 mi. W San Angelo, 1; 0.7 mi. N, 6.2 mi. W San Angelo, 1; 7.5 mi. W San Angelo, 1; San Angelo, 2; 3.6 mi. S, 1 mi. W San Angelo, 1; 3.5 mi. N Veribest, 1.

Taxidea taxus (Schreber)
American Badger

Bailey (1899) recorded, "badger holes seen all along from San Angelo to Big Spring". At that time, he wrote that the range of the badger was the same as for the prairie dog (*Cynomys ludovicianus*) "in this part of Texas". Later, Bailey (1918) wrote that they are "scattered all over the country" and "burrows were seen in almost every prairie dog town". Today, badgers have been seen over all the county, except Lipan Flat. Sixteen of the 25 landowners surveyed in 1993 indicated badger sightings within the last year. The most recent specimen for the county was taken at 8.9 mi. S, 6.3 mi. W San Angelo on 20 November 1993. Additional sightings indicate the American badger to be fairly common over the majority of Tom Green County.

Specimens examined.— 4 mi. N Christoval, 1; 7 mi. S San Angelo, 1; 6 mi. S, 3 mi. W San Angelo, 1; 4.5 mi. N, 7.5 mi. W San Angelo, 1; 8.9 mi. S, 6.3 mi. W San Angelo, 1.

Additional records (USNM).— 6 mi. NE Carlsbad, 2; 12 mi. S San Angelo, 5.

Bassariscus astutus (Lichtenstein)
Ringtail

Bailey (1918) made no mention of ringtails in the San Angelo area. Today, the ringtail is fairly widespread within Tom Green County, except for the Lipan Flat area. Although we have very few specimens, 19 of the landowners surveyed indicated that ringtails exist on their lands presently.

Specimens examined.— 2.4 mi. S Christoval, 1; 3 mi. S Christoval, 1; 5 mi. S Christoval, 1; 2.8 mi. S, 2 mi. E San Angelo, 1; 15 mi. SE San Angelo, 1; 7 mi. SE Water Valley, 1 (TTU).

Additional records (TNHC).— 2 mi. S San Angelo, 1.

Procyon lotor (Linnaeus)
Common Raccoon

The common raccoon can be found everywhere within this county. The abundance of these mammals is most obvious when driving along the major roadways, as they are the mammals most commonly killed by vehicles.

Specimens examined.— 5 mi. S Christoval, 11; 3 mi. N, 1.5 mi. W Mereta, 2; 8 mi. N, 8 mi. W San Angelo, 1; 5.5 mi. N, 7 mi. W San Angelo, 1; 5 mi. N, 5 mi. W San Angelo, 1; 4 mi. N, 5 mi. W San Angelo, 3; San Angelo, 5; 9.2 mi. S, 5 mi. W San Angelo, 1; 10.9 mi. S, 4.6 mi. W San Angelo, 1; Tankersley, 1.

Additional records (USNM).— 10 mi. E Carlsbad, 2; Water Valley, 2.

**Pecari tajacu* (Linnaeus)
Collared Peccary

There are four ASNHC specimens of collared peccary in Tom Green County; this species appears to be fairly uncommon in the county. However, 17 of the Tom Green County landowners surveyed had seen peccaries on their land in the five years prior to the survey. Of those 17, 12 indicated they had seen the animals on their ranches within the last year. They are distributed over most of the county, except for the Lipan Flat region. Hollander et al. (1987a) and Simpson and Max-

well (1989) extended the known distribution of the pecary to include the northwestern (Upton County) and northern (Coke County) limits of the Edwards Plateau. The specimens listed herein further verify the presence of the species in this region.

Specimens examined.— 5 mi. S Christoval, 1; 2 mi. S, 3.6 mi. W Knickerbocker, 1; 5 mi. N, 5 mi. W San Angelo, 1; San Angelo, 1.

Odocoileus virginianus (Zimmerman)
White-tailed Deer

Bailey (1918) did not mention white-tailed deer in this area, but earlier he wrote, "the white-tailed deer are found all through the least settled parts of this region. Their horns (*sic*) were seen at San Angelo, Sterling, and at many of the ranches" (Bailey, 1899). Today, white-tailed deer are common in Tom Green County, evidenced mainly by the large number of those killed on the roads and taken by hunters. It is not uncommon to find white-tailed deer dead on roadsides in all areas of the county, less often on the Lipan Flat, which lacks suitable cover provided by brush and woods. These deer also are found occasionally in urban areas.

Specimens examined.— 4 mi. S Christoval, 1; 5 mi. S Christoval, 6; 14 mi. N San Angelo, 1; 4 mi. N, 4 mi. W San Angelo, 1; 9.2 mi. S, 6.1 mi. W San Angelo, 1; 14.9 mi. S, 14.9 mi. W San Angelo, 1; 1.8 mi. S, 0.4 mi. W Water Valley, 1.

Antilocapra americana (Ord)
Pronghorn

Bailey (1899) wrote that he was told of a "bunch" of 50 antelope living 15 mi. west of Water Valley (Sterling County) and another "bunch" six mi. east. Today, the nearest natural population is in Reagan County, and there is a single specimen of an unknown date reported from Coke County (Simpson and Maxwell, 1989). Although the pronghorn is not resident in Tom Green County presently, there may be an occasional transient. Known resident populations exist in Reagan and Irion counties adjacent to the Tom Green County panhandle.

Bison bison (Linnaeus)
Bison

Historically, the Concho River Basin was a winter feeding and watering ground for immense herds of bison. Day (1960) wrote of the bison in the Concho Valley before 1880: "The southern edge of the main buffalo range was in the vicinity of the valleys of the Concho rivers. Buffalo arrived in the Concho region simultaneously with the first northers, usually in early October, and they ranged there until March of the following year when the weather began to get warmer. Sometimes a few spent the summer, but they did not do particularly well because of the excessive heat. The Middle Concho, which heads in Centralia Draw approximately fifty miles west of San Angelo, furnished the favorite ranges of the buffalo in this area. The North and South Conchos also provided adequate feeding grounds as did Dove Creek and Spring Creek." In January 1876, H. B. McDaniel and N. A. Taylor encountered an estimated 30,000 bison on the North Concho River (Shultz, 1988). Professional bison hunters had moved into the Concho Basin by 1876. One year later only a few bison were seen on the rivers and in 1879 none returned (Shultz, 1988).

Cynomys ludovicianus (Ord)
Black-tailed Prairie Dog

Bailey (1899) reported that (black-tailed) prairie dogs were "said to extend some 30 miles east of" San Angelo. He wrote that the whole country was populated by them and that they were so numerous and evenly distributed that they did not appear to be grouped in colonies. This part of the country at the turn of the century was grassy mesquite plains.

Oberholser (1901) wrote that *C. ludovicianus* was "abundant from San Angelo to about 15 miles southwest of Sherwood". His account maintains that the prairie dog towns were not continuous in that area.

Bailey traveled through the "San Angelo region" again in March of 1918. This time he saw very few prairie dogs in any one town, and none in some, except for one large town about 5 mi. west of San Angelo in which he said there were many occupants. He estimated that the number of prairie dogs alive in 1918 were fewer

than 10 percent of what had lived there 20 years earlier. The farmers and ranchers, along with the help of the Biological Survey, managed to successfully control the one-time pest. Bailey (1918) wrote, "the few colonies that remain have little economic importance and are scarcely more than should be retained as an interesting relic of the animal life in the region."

The single specimen from the county was collected 1.5 mi. N Water Valley on 11 April 1967. Efforts to locate the colony from which it was collected were unsuccessful in 1993. It is possible that naturally occurring colonies of prairie dogs no longer exist in Tom Green County. Today, there is a small colony known to exist within the city limits of San Angelo, but these animals are the remnants of a captive group moved from Lubbock, Texas.

Specimens examined.— 1.5 mi. N Water Valley, 1.

Sciurus niger Linnaeus
Eastern Fox Squirrel

The eastern fox squirrel is abundant in those areas of Tom Green County which have suitable habitat, such as "pecans, walnuts, oaks, and other 'required' trees" (Davis and Schmidly, 1994). Fox squirrels are most often found in riparian forests where those trees are most abundant, in the city parks of San Angelo, lawns, campuses, along the South, Middle, and North Concho rivers and their tributaries, as well as along the main Concho River. No records have been reported from areas directly west of Tom Green County.

Specimens examined.— Christoval, 1; 1 mi. S Christoval, 1 (TTU); 5 mi. S Christoval, 1; 6 mi. S, 16 mi. W Eden (Concho Co.), 2 (TTU); San Angelo, 8; 7.3 mi. S, 4 mi. W San Angelo, 1.

Additional records (USNM).— San Angelo, 1.

Spermophilus mexicanus (Erxleben)
Mexican Ground Squirrel

The Mexican ground squirrel is known to occur at least within the western half of Tom Green County where it is locally common. It is likely to occur also in

the eastern half, in the small grassland plots that dot Lipan Flat, but we have no records for the area.

The species is common in urban environments (cemeteries, golf courses, parks, lawns, and vacant lots). Shockley (1974) reported that the ground squirrels in his study area (a golf course 5.3 mi. southwest of San Angelo) dug through and underneath a hardened layer of caliche to a depth of 14 to 20 inches. Males had an average home range of 9.85 acres and females, 3.07 acres. He found that the home range of one ground squirrel may overlap with those of as many as five other individuals.

Shockley (1974) also reported that male and female ground squirrels in Tom Green County were pairing during the first week of April. The mated pairs lived together in one burrow during the reproductive period until after the young were born. The male then moved to another burrow. He reported a gestation period of 27 to 29 days and an average litter size of seven, with the smallest litter containing five young. Tom Green County records in the ASNHC include one lactating female taken on 15 June and one pregnant female on 1 June.

Specimens examined.— 5.2 mi. N, 6.3 mi. W San Angelo, 2; 4 mi. N, 5 mi. W San Angelo, 1; San Angelo, 13; 0.7 mi. S, 3.9 mi. W San Angelo, 1; 3 mi. S, 3 mi. W San Angelo, 3; 4.8 mi. S, 2.4 mi. W San Angelo, 1; 4.9 mi. S, 3.5 mi. E San Angelo, 4; 6 mi. S, 3 mi. W San Angelo, 13; 7.7 mi. S, 4.2 mi. W San Angelo, 2(TTU); 0.8 mi. N, 1.2 mi. W Water Valley, 1.

Additional records.— 8 mi. W Carlsbad, 3 (TCWC); San Angelo, 2 (USNM); 2 mi. S San Angelo, 1 (TNHC).

**Spermophilus variegatus* (Erxleben)
Rock Squirrel

Simpson and Maxwell (1989) reported only one specimen from the northeast corner of Coke County, indicating that Tom Green County may be the northern limit in the region for the common occurrence of this species. Rock squirrels appear to be locally common in suitable habitats (rocky slopes, usually at or near water courses) in Tom Green County. Several populations

have been observed from scattered localities throughout the county.

Specimens examined.— 5 mi. S Christoval, 1; San Angelo, 2; Water Valley, 1.

****Castor canadensis* Kuhl
American Beaver**

American beavers have been seen by ten of the 25 landowners who participated in our survey, and another claims "strong evidence of their presence". Three had not seen a beaver in more than 20 years, two had seen one or more in the five years prior to the survey, and five had seen them within the last year. The latter five indicated that these sightings were within a few miles of O. C. Fisher Lake, Lake Nasworthy, or Twin Buttes Reservoir. *Castor canadensis* is known from an archeological site (South Concho River) in Late Archaic deposits at least 1400 years old (Scott and Creel, 1990). Davis and Schmidly (1994) do not include Tom Green County in the distribution of *C. canadensis*, but Hall (1981) does, although he had no records from this region of the state. Simpson and Maxwell (1989) provided the first regional record from Coke County and Thornton and Lee (1996) documented the first record from Taylor County, extending its range into central Texas. The single specimen collected by ADC trappers at Lake Nasworthy on 6 February 1989 is the first for Tom Green County. John Dorsett (ADC, pers. comm.) contends that there are beavers on the Concho River in San Angelo. We have observed beaver tree cuttings as well as a lodge and a dam near San Angelo on the South Concho River immediately east of the Twin Buttes Reservoir dam. A second specimen was salvaged from Catalina Street within the city. Beavers are probably much more numerous within the county than is evident by specimens alone.

Specimens examined.— 1 mi. N, 2 mi. W San Angelo, 1; 5.9 mi. S, 3.2 mi. W San Angelo, 1.

***Thomomys bottae* (Eydoux and Gervais)
Botta's Pocket Gopher**

The distribution of Botta's pocket gopher was documented for this region by Hollander et al. (1987a). One specimen was taken recently at 11 mi. S, 2.5 mi. E

Vancourt in the southeastern corner of the county. Based on known records, the species has not invaded the Rolling Plains region of this county. Simpson and Maxwell (1989) reported that *T. bottae* possibly occurs in the suitable soils of southern Coke County due to its occurrence very near to Coke County, but presently, Tom Green County appears to be the northern limit of this species in Texas.

Specimens examined.— Christoval, 2; 4.2 mi. S, 1.5 E Christoval, 2; 5 mi. S Christoval, 1; 11 mi. S, 3 mi. E Vancourt, 1.

Additional records (TCWC).— 8 mi. W Carlsbad, 2; 6.5 mi. SW San Angelo, 1.

****Chaetodipus hispidus* Baird
Hispid Pocket Mouse**

Chasteen (1975) found the hispid pocket mouse to utilize areas generally avoided by *Perognathus merriami* in Tom Green County. *Chaetodipus hispidus* was found in areas with heavy ground cover, most notably horehound (*Marrubium vulgare*). This mouse is distributed throughout the county, but is most abundant around O. C. Fisher Lake.

Chasteen (1975) found scrotal males in the county between May and September 1973, with a peak reproductive period in May, and from March to June 1974. Females in breeding condition were present from June through October 1973.

Specimens examined.— 4 mi. S Christoval, 1; 3 mi. N, 1.5 mi. W Mereta, 1; 10 mi. N San Angelo, 1; 4 mi. N, 5 mi. W San Angelo, 8; 3.8 mi. N, 4.1 mi. W San Angelo, 2; 3.3 mi. N, 3.6 mi. W San Angelo, 7; San Angelo, 1; 0.5 mi. S Water Valley, 2; 0.6 mi. S, 2.5 mi. W Water Valley, 1.

Additional records.— 6.5 mi. SW San Angelo, 1 (TCWC); 4 mi. WSW San Angelo, 1 (MVZ).

***Perognathus merriami* J. A. Allen
Merriam's Pocket Mouse**

Chasteen (1975) found Merriam's pocket mouse in Tom Green County to be most common in areas of soft, friable soils with short, sparse ground cover. The

distribution of *P. merriami* includes the western half and the southern two-thirds of Tom Green County. All specimens have been collected very near a water source. They are most abundant near the permanent reservoirs, O. C. Fisher and Twin Buttes; they are not common in the remainder of the county. Lee and Engstrom (1991), in a systematic study of *P. flavus*, concluded that silky pocket mice in Tom Green County are *P. merriami*.

In Tom Green County, the gestation period of Merriam's pocket mouse appears to be no more than 29 days (Chasteen, 1975). One pregnant female was taken on 22 May (5 fetuses, crown-rump length = 4.5). Chasteen (1975) captured breeding females from May through October and scrotal males from April through July.

Specimens examined.— 4 mi. S Christoval, 2; 4.1 mi. S, 1.8 mi. E Christoval, 1; 5 mi. S Christoval, 2; 5 mi. N, 9 mi. W San Angelo, 1; 4 mi. N, 5 mi. W San Angelo, 5; 3.3 mi. N, 3.6 mi. W San Angelo, 6; San Angelo, 1; 9.2 mi. S, 6.1 mi. W San Angelo, 24; 14.9 mi. S, 14.9 mi. W San Angelo, 1.

Mus musculus Linnaeus House Mouse

The house mouse usually lives in close association with humans (Davis and Schmidly, 1994). They are quite common in fields, around waterways, and in areas of mesquite-mixed grassland within this county. Although the specimens mentioned in this report are relatively few, the distribution of *M. musculus*, no doubt, includes the entire county.

Specimens examined.— 3 mi. N, 1.5 mi. W Mereta, 1; 4 mi. N, 5 mi. W San Angelo, 1; 3.3 mi. N, 3.6 mi. W San Angelo, 1; 2 mi. N, 2.7 mi. W San Angelo, 1; San Angelo, 4; 6.5 mi. S, 2 mi. W San Angelo, 1; Water Valley, 1; 0.5 mi. S Water Valley, 4.

Additional records (TNHC).— 2 mi. S San Angelo, 3.

Rattus rattus (Linnaeus) Roof Rat

The roof rat is typically found in urban areas throughout the state (Davis and Schmidly, 1994) and they are quite common in San Angelo, although we have obtained few specimens. The pest control services are called upon regularly to help control what they believe are both species of *Rattus* (*norvegicus*, *rattus*) within San Angelo, however, the presence of *R. norvegicus* remains unconfirmed.

Specimens examined.— San Angelo, 1; 4.9 mi. S, 3.5 mi. E San Angelo, 1.

**Baiomys taylori* (Thomas) Northern Pygmy Mouse

In Tom Green County northern pygmy mice occur in grassy and weedy areas in all habitats and usually in association with cotton rats, *Sigmodon hispidus* (Davis and Schmidly, 1994), although they are much less common. Records available for this study indicate that in rocky, thin-soiled sites, this mouse is to be expected only where herbaceous plants grow densely, such as along roadside fencelines.

Hall (1981) and Davis (1974) placed the distribution of the northern pygmy mouse as far west as McCulloch County, Texas. It has been claimed that in recent years the range of *B. taylori* has expanded in Texas to the north (Choate et al., 1991; Hollander et al., 1987b) and to the west (Choate et al., 1990, 1991). Other records of occurrence in north, north-central, and northwest Texas have been reported by Stangl et al. (1983), Cleveland (1986), and Austin and Kitchens (1986). On the Edwards Plateau, new western records were published for Coke County by Simpson and Maxwell (1989) and for Schleicher County by Hollander et al. (1987a). It is apparent, however, that this mouse was present in Tom Green County, adjacent to Coke and Schleicher Counties, at least 14 years prior to collections from those counties. Furthermore, 1972 and 1973 collection localities illustrate a widespread distribution in this county, suggesting the likelihood of establishment prior to the 1970's. The present geographical range is summarized by Davis and Schmidly (1994),

but does not reflect the Tom Green County collections of *B. taylori*.

One adult female taken on 9 August contained three fetuses. One lactating female was collected on 17 July.

Specimens examined.— 5 mi. S Christoval, 2; 5.1 mi. S, 0.2 mi. W Christoval, 1; 14 mi. N San Angelo, 4; 10 mi. N San Angelo, 2; 6 mi. N, 11.1 mi. E San Angelo, 1; 4 mi. N, 5 mi. W San Angelo, 5; 0.9 mi. N, 3.6 mi. W San Angelo, 1; 4.5 mi. S, 7 mi. W San Angelo, 1; 10.8 mi. S, 2.2 mi. W San Angelo, 3; 11 mi. S, 3 mi. E Vancourt, 5.

****Neotoma albigula* Hartley**
White-throated Wood Rat

The white-throated wood rat has been taken from only two sites within the county, on limestone hills in juniper-live oak vegetation. These areas are very dry and conducive to the brushy vegetation that could be used in building their middens. This species is neither common nor widespread in the county. Simpson and Maxwell (1989) reported the first specimens taken in this region of the state. One pregnant female carrying two fetuses was collected on 8 March.

Specimens examined.— 14 mi. N San Angelo, 1; 10 mi. N San Angelo, 4.

***Neotoma micropus* Baird**
Southern Plains Wood Rat

The southern plains wood rat has been taken infrequently over the southern three-fourths of the county, usually in areas thick with mesquite and short grasses. Testes lengths of adult males were as follows: June, 18; July, 9; October, 7, 9, and 13.

Specimens examined.— 4 mi. S Christoval, 1; 5 mi. S Christoval, 2; 5.3 mi. S, 0.7 mi. E Christoval, 1; 3 mi. N, 1.5 mi. W Mereta, 2; 6 mi. N, 11.1 mi. E San Angelo, 1; 0.9 mi. N, 5.8 mi. W San Angelo, 1; 2.4 mi. S San Angelo, 1; 4.5 mi. S, 7 mi. W San Angelo, 2; 9.7 mi. S, 9.8 mi. W San Angelo, 1.

Additional records (USNM).— San Angelo, 4.

***Onychomys leucogaster* (Wied-Neuwied)**
Northern Grasshopper Mouse

The single specimen of the northern grasshopper mouse from Tom Green County was a female collected by Oberholser in April 1901. The only other known record from this county is from an archaeological site (South Concho River) in deposits aged no later than approximately A. D. 1650 (Scott and Creel, 1990).

Simpson and Maxwell (1989) did not find this species in Coke County, despite numerous attempts in apparently suitable habitat. Choate et al. (1992), however, found it to be common throughout the southern edge of the Kansan biotic province, approaching to within about 40 mi. west of Coke and Tom Green counties in Midland County. Although previously present, if it occurs today in Tom Green or adjacent counties, *O. leucogaster* must be rare or highly localized.

Specimens examined (USNM).— San Angelo, 1.

***Peromyscus attwateri* J. A. Allen**
Texas Mouse

The Texas mouse has a wide range of distribution within this county. These mice are most frequently found near the northern, western, and southern boundaries of the county, where their preferred habitats are common. They inhabit the rough, rocky slopes and exposed rock faces of limestone hills, being particularly common in areas of liveoak-juniper-mesquite and juniper-mesquite associations on thin, rocky soils. Like the white-ankled mouse (*P. pectoralis*), the Texas mouse prefers sloping limestone ledges, but it differs in its preference for grass-dominated areas (Etheredge et al., 1989). In both habitat types, the Texas mouse has been found to take refuge in brushpiles, up oak trees, and under fallen logs.

One female taken in March had three placental scars. Testes length of adult males were as follows: February, 6 and 10; March, 6; July, 7; August, 8 and 12; September, 11; October, 12 and 14; November, 13 and 14.

Specimens examined.— 4 mi. S Christoval, 5; 5 mi. S Christoval, 1; 14.2 mi. N, 5 mi. W San Angelo, 4;

14 mi. N San Angelo, 5; 13.5 mi. N San Angelo, 1; 10 mi. N San Angelo, 22; 9 mi. N San Angelo, 3; 14.9 mi. S, 14.9 mi. W San Angelo, 1; 7.8 mi. S, 13.3 mi. W Water Valley, 1.

Additional records (MWSU).— 14.2 mi. N, 5 mi. W San Angelo, 1; 1.8 mi. S, 0.4 mi. W Water Valley, 3.

****Peromyscus leucopus* (Rafinesque)**
White-footed Mouse

The white-footed mouse prefers riparian and brushy habitats. Specimens collected during this study were taken in areas of various plant associations, such as second growth mesquite with Texas speargrass (*Stipa leucotricha*) as dominant ground cover, tall headwater forests dominated by pecan and bur oak (*Quercus macrocarpa*) with ground cover of speargrass, mesquite-brush with speargrass-tobosa-buffalo grass, juniper-savannah with yucca (*Yucca* sp.), prickly pear (*Opuntia* sp.), and purple three-awn (*Aristida purpurea*), and juniper-livcoak-mesquite associations. In Tom Green County, *P. leucopus* is about equal in abundance to that of *P. attwateri*, but *P. leucopus* is much more diverse in habitat preference. It is common throughout the county.

Pregnant females were taken in May (4 fetuses, crown-rump length = 6.5; 9 fetuses, crown-rump length = 9.5), June (4 fetuses, crown-rump length = 4; 4 fetuses, crown-rump length = 7), and August (3 fetuses, crown-rump length = 15). One lactating female was taken in March. Testes lengths in adult males were as follows: February, 13; May, 9; June, 10-12; July, 10; August, 11-13; September, 13. Litter size typically varies from one to seven (Schmidly, 1977, 1983) yet in May 1992 a female carrying 9 fetuses was taken.

Specimens examined.— 3.5 mi. S, 0.4 mi. W Christoval, 2; 4 mi. S Christoval, 1; 5 mi. S Christoval, 7; 5.3 mi. S, 0.7 mi. E Christoval, 1; 3 mi. N, 1.5 mi. W Mereta, 1; 14.2 mi. N, 6 mi. W San Angelo, 1; 10 mi. N San Angelo, 13; 6 mi. N San Angelo, 1; 5 mi. N, 5 mi. W San Angelo, 5; 4 mi. N, 5 mi. W San Angelo, 1; 3.3 mi. N, 3.6 mi. W San Angelo, 2; 2.9 mi. N, 6.1 mi. W San Angelo, 2; 1.8 mi. N, 6.5 mi. W San Angelo, 5; 0.9 mi. N, 5.8 mi. W San Angelo, 3; 0.9 mi. N, 3.6 mi.

W San Angelo, 1; 14.9 mi. S, 14.9 mi. W San Angelo, 1; 0.6 mi. S, 2.5 mi. W Water Valley, 1; 7.8 mi. S, 13.3 mi. W Water Valley, 1.

Additional records (TNHC).— 2 mi. S San Angelo, 1.

***Peromyscus maniculatus* (Wagner)**
Deer Mouse

The deer mouse has been collected in several habitats within the county, including low stony hill sites with shallow soils and mesquite brushland vegetation and, in at least one area of the county (3.5 mi. S, 0.4 mi. W Christoval), in tall headwater forests with heavy stands of Texas speargrass and green-brier (*Smilax smallii*). This species has not been taken in either the northwestern portion (west and south of Water Valley) or in the southeastern portion (south and east of San Angelo) of the county. It may very well be more widespread than indicated by specimens in the ASNHC, but it is not common within the county.

Peromyscus maniculatus and *P. leucopus* are distinguished only with great difficulty. In a comparative study of the genus *Peromyscus* in Tom Green County, Jensen (1980) determined that *P. maniculatus* had a smaller range of measurements (including skull, tail, and total body lengths) than *P. leucopus*, but in all instances, those ranges for the two species overlapped. Therefore, in Tom Green County, the distinctly bicolored tail of *P. maniculatus* is the best method of morphological separation of the two species.

The specimens in the ASNHC include one lactating female collected on 6 June and one pregnant female containing 4 fetuses collected on 28 June, (crown-rump length = 14). Testes lengths of adult males were as follows: May, 5 and 8; June, 8; October, 8.5 and 11.

Specimens examined.— 3.5 mi. S, 0.4 mi. W Christoval, 1; 5 mi. S Christoval, 2; 3 mi. N, 1.5 mi. W Mereta, 4; 10 mi. N San Angelo, 1; 8.5 mi. N, 11.9 mi. W San Angelo, 2; 4 mi. N, 5 mi. W San Angelo, 3; 3.7 mi. N, 4.4 mi. W San Angelo, 1; 1.8 mi. N, 6.5 mi. W San Angelo, 4; 0.9 mi. N, 5.8 mi. W San Angelo, 2; 14.9 mi. S, 14.9 mi. W San Angelo, 1.

Peromyscus pectoralis Osgood
White-ankled Mouse

The white-ankled mouse is absent from the northwestern part (west of a line extending from north to south of Carlsbad) and from the southeastern part of the county (east of a line extending to the north and south from a point about 1 mi. east of San Angelo). It has been found in some of the same locations within the county as the Texas mouse (*P. attwateri*). *Peromyscus pectoralis* prefers sloping limestone ledges with scattered rocks and dense leaf litter (Etheredge et al., 1989). Although the two species are very similar at first sight, they are easily separated upon comparison of tail, skull, and total body lengths (Jensen, 1980), and examination of hind foot length and ankle color. The white-ankled mouse is found in much greater abundance than *P. attwateri* in the southern part of its range in the county, and in much lesser abundance than *P. attwateri* in the northern part of the county. Etheredge et al. (1989) found that the two species live sympatrically in at least one area of Tom Green County, 4 mi. S Christoval, with *P. pectoralis* preferring the rocky and brushy habitats, and *P. attwateri* favoring the areas with trees and fallen logs. Etheredge et al. (1989) reported capture of the two species in the same trapping grid, and R. C. Stone (pers. comm.) maintains that the two have been caught in the same trap line in the north-central portion of the county. Neither of the species was caught in areas covered predominantly by grass and with few or no trees, scattered rocks, or limestone ledges.

Etheredge and Engstrom (1991) reported this species capable of year-round reproduction in Tom Green County, but with an increased level from September through May and particularly from October through March.

Specimens examined.— 4 mi. S Christoval, 88; 5 mi. S Christoval, 6; 5.3 mi. S, 0.7 mi. E Christoval, 26; 14.2 mi. N, 5 mi. W San Angelo, 4; 13.1 mi. N, 0.4 mi. E San Angelo, 1; 10 mi. N San Angelo, 10; 2.9 mi. S, 2.5 mi. W San Angelo, 1; 14.9 mi. S, 14.9 mi. W San Angelo, 14.

Reithrodontomys montanus (Baird)
Plains Harvest Mouse

Although Tom Green County is well within the distributional range of the plains harvest mouse, it has been collected at only three sites, indicating a narrow range of optimum habitat (probably dense grass) for these mice within the county. One pregnant female was collected on 10 November.

Specimens examined.— 5 mi. S Christoval, 2; 4 mi. N, 5 mi. W San Angelo (MIR Center), 9; 10.8 mi. S, 2.2 mi. W San Angelo, 1.

**Sigmodon hispidus* Say and Ord
Hispid Cotton Rat

The hispid cotton rat in Tom Green County is found typically in areas covered with thick, coarse, tall grass. During this study, these rodents were taken in great numbers from around O. C. Fisher Lake. The species is probably common throughout the county in areas with adequate ground cover, although they have yet to be found on any part of the Head of the River Ranch, 5 mi. south of Christoval, the site where many ASNHC vertebrates have been collected. Pregnant females have been taken in May (12 fetuses, crown-rump length = 9), June (5 fetuses, crown-rump length = 45; 7 fetuses, crown-rump length = 10; 6 fetuses, crown-rump length = 13), August (7 fetuses, crown-rump length = 7.5; 4 fetuses, crown-rump length = 20; 4 fetuses, crown-rump length = 10), and November (5 fetuses, crown-rump length = 18; 6 fetuses, crown-rump length = 15). Testes lengths of males are as follows: February, 18; June, 10-23; September, 19; October, 15; November, 7-12.

Specimens examined.— 3 mi. N, 1.5 mi. W Mereta, 2; 14 mi. N San Angelo, 1; 10 mi. N San Angelo, 13; 4 mi. N, 5 mi. W San Angelo, 8; 4.4 mi. N, 3 mi. W San Angelo, 1; 3.8 mi. N, 4.1 mi. W San Angelo, 1; 3.3 mi. N, 3.6 mi. W San Angelo, 3; 2.9 mi. N, 6.1 mi. W San Angelo, 2; 2 mi. N, 2.7 mi. W San Angelo, 1; 1.8 mi. N, 6.5 mi. W San Angelo, 3; 0.9 mi. N, 5.8 mi. W San Angelo, 1; 0.5 mi. N San Angelo, 3 (TTU); 3.1 mi. W San Angelo, 11; San Angelo, 3; 3 mi. S San Angelo, 2; 4.8 mi. S, 5.5 mi. W San Angelo, 1; 9.7 mi. S, 9.8 mi. W San Angelo, 1; Water Valley, 1;

0.5 mi. S Water Valley, 1; 1.8 mi. S, 0.4 mi. W Water Valley, 1; Tom Green County, 2.

Additional records.— 7 mi. N San Angelo, 3 (TWU); 6.5 mi. SW San Angelo, 6 (TCWC).

****Erethizon dorsatum* (Linnaeus)**
Porcupine

The porcupine is widespread throughout Tom Green County, and common in areas with a concentration of woody vegetation. Only two of the landowners surveyed in 1993 indicated they had not seen a porcupine on their lands in the past year. They occupy every habitat and vegetation type within the county, at least temporarily. Simpson and Maxwell (1989) reported that the porcupine was rare in Coke County which borders northern Tom Green County. One of us (Maxwell) has seen porcupines foraging on three separate occasions. In each instance, the animals were eating the bark from the top of a hackberry tree. These sightings may be coincidental, but it may be that, at least in this area, these rodents prefer this species of tree.

Specimens examined.— 3 mi. N, 2 mi. W Mereta, 1; 14 mi. N San Angelo, 1; 2 mi. S, 14 mi. W San Angelo, 1; 7 mi. S San Angelo, 1; 10 mi. S, 7.6 mi. W San Angelo, 1; 11 mi. S San Angelo, 1; 2.4 mi. S, 1.2 mi. E Water Valley, 1.

****Myocastor coypus* (Molina)**
Nutria

Based on current data, including specimens, landowner surveys, and additional sightings, the nutria is a common and widespread inhabitant of riparian environments within this county. One pregnant female was collected on 21 June.

Specimens examined.— 1.5 mi. N. Christoval, 1; 5 mi. S Christoval, 1; 14 mi. N San Angelo, 1; 4 mi. N, 5 mi. W San Angelo, 1; San Angelo, 1; 6 mi. S, 3 mi. W San Angelo, 3.

***Lepus californicus* Gray**
Black-tailed Jackrabbit

The black-tailed jackrabbit is present in relative abundance in the mesquite-grassland and mesquite-ju-

niper associations, limestone hills, and all dry, rocky-soiled habitats throughout Tom Green County. Testes length of a male taken in March was 50; testes of a male taken in August measured 35.

Specimens examined.— 1.5 mi. S, 3 mi. W Knickerbocker, 1; 3.5 mi. N, 5 mi. W San Angelo, 2; 7 mi. W San Angelo, 2; San Angelo, 1; 3.6 mi. S, 1.2 mi. W San Angelo, 1.

Additional records (TCWC).— 5 mi. NW San Angelo, 1; 8 mi. W Carlsbad, 2.

***Sylvilagus audubonii* (Baird)**
Desert Cottontail

The desert cottontail is difficult to identify by sight, so it may be more common than is evident by the number of specimens taken in Tom Green County. From all indications, *S. audubonii* is rare in the county. Davis (1974) and Davis and Schmidly (1994) reported a previous record, but we have not been able to locate it.

Specimens examined.— 5 mi. N, 9 mi. W San Angelo, 1; 6 mi. S Water Valley, 1.

****Sylvilagus floridanus* (J. A. Allen)**
Eastern Cottontail

Based on the number and distribution of collecting sites of those specimens obtained, the eastern cottontail is obviously common and probably widespread within the county. There is one ASNHC record of a male taken on 29 July with enlarged testes and another taken on 12 August with testes length of 45. Pregnant females have been taken on 29 July (2 fetuses), 12 August, and 14 September (4 fetuses, crown-rump length = 60). Nestling eastern cottontails have been observed in May.

Specimens examined.— 2.8 mi. S, 3.3 mi. E Christoval, 2; 5 mi. S, 5.2 mi. E Christoval, 1; 4.3 mi. N, 6.4 mi. E Knickerbocker, 1; 8.6 mi. N, 9.5 mi. W San Angelo, 1; 5.2 mi. N, 6.3 mi. W San Angelo, 11; 4 mi. N, 5 mi. W San Angelo, 19; 0.4 mi. N, 5 mi. W San Angelo, 1; San Angelo, 2; 5.1 mi. S, 3.3 mi. W San Angelo, 3; 5.2 mi. S, 5.9 mi. W San Angelo, 2; 5.7 mi. S, 7 mi. W San Angelo, 1; 6.2 mi. S, 3.5 mi. W San

Angelo, 1; 9 mi. S, 5 mi. W San Angelo, 9; 5 mi. W Water Valley, 1 (TTU).

Additional records (TCWC).— 8 mi. W Carlsbad, 1.

SPECIES OF UNVERIFIED OCCURRENCE

The presence of eight species of mammals is unconfirmed. It is conceivable that some of these may be uncommon enough to elude traps, while others may occasionally wander into this county as transients, not remaining long enough for their presence to be confirmed or documented. At least one of these species (*Mustela nigripes*) certainly is extirpated.

Vulpes velox (Say).— Davis (1974) reported the distribution of *V. velox* (swift or kit fox) from Upton County (west of Tom Green County) northward and *V. macrotis* (desert fox) from Glasscock, Reagan, and Crockett counties to the west. The swift fox (*V. v. velox*) and the desert fox (*V. v. macrotis*) are now considered to be conspecific (Dragoo et al., 1990; Wilson and Reeder, 1993). However, Mercure et al. (1993) state that although there is geographically limited hybridization among kit and swift fox populations, mitochondrial DNA studies suggest that they are two distinct species. Hollander et al. (1987a) reported two *V. v. velox* specimens from Menard County. Creel and Thornton (1970) reported records of *V. v. macrotis* from Reagan, Crockett, Glasscock, and Crane counties and *V. v. velox* from Martin and Midland counties. It is possible that either or both subspecies occur in Tom Green County; Davis and Schmidly (1994) included Tom Green County within its probable distribution.

Leopardus pardalis (Linnaeus).— Davis (1974) and Hall (1981) both indicated that the ocelot was widely distributed over Texas, including this county. However, there is no confirmation that the ocelot is or ever has been in Tom Green or any surrounding county. Davis and Schmidly (1994) removed this region from their probable distribution for the species.

Mustela frenata Lichtenstein.— Davis' (1974) distribution of the long-tailed weasel did not include

the High Plains, Rolling Plains, or the northern half of the Edwards Plateau. Although Hall (1981) showed the distribution of the long-tailed weasel to include almost all of the United States, part of Canada, and most of Mexico, he indicated no records or reports from this same large area of the state. Davis and Schmidly (1994) indicated its presence in all but the northern Panhandle. There are no records known to us of this weasel from Tom Green County. Jones and Jones (1992) reported that the long-tailed weasel probably occurs throughout the state, but that it is rare in most areas, especially in northern and western Texas.

Mustela nigripes (Audubon and Bachman).— Davis and Schmidly (1994) reported that the black-footed ferret was once distributed over "roughly the northwestern third of Texas including the Panhandle, much of the Trans-Pecos, and a considerable part of the rolling plains east and southeast of these areas. Now extirpated from Texas." It is widely argued that the destruction of prairie dog towns in the early 20th century is largely responsible for the ferret's extirpation in much of its former range (see Hillman and Clark, 1980 for a thorough review of this opinion). Prairie dogs are the main source of the ferret's food, and their burrows provide the ferrets with shelter and nursery sites (Davis and Schmidly, 1994). There are no records indicating that it was ever present in Tom Green County, but there were at one time, many prairie dog towns they may have occupied had they indeed been here.

Spermophilus spilosoma Bennett.— Although there are no records of the spotted ground squirrel from Tom Green County, it is likely to be found at least in the western reaches of the panhandle, as indicated in the distribution published by Davis (1974) and Davis and Schmidly (1994).

Pappogeomys castanops (Baird).— Jones and Jones (1992) reported that the yellow-faced pocket gopher is found in the western third of the state from the Panhandle to Val Verde County and throughout the Trans-Pecos region. Specimens have been reported from all three counties (Sterling, Reagan, Irion) adjacent to the panhandle of Tom Green County (Thornton and Creel, 1975) suggesting the presence of this species in the westernmost parts of the county. Other near records include Glasscock (Thornton and Creel, 1975), Howard

and Martin (Choate et al., 1992), and Terrell, Crane, Pecos and Upton counties (Hollander et al., 1987a).

Rattus norvegicus (Berkenhout).— We have no specimens of the Norway rat from Tom Green County, but local pest exterminators maintain that this species is as numerous in San Angelo as are roof rats, *R. rattus*.

Reithrodontomys fulvescens J. A. Allen.— The fulvous harvest mouse is reported to occur in eastern and central Texas and parts of the Trans-Pecos region (Jones and Jones, 1992). Westernmost records in west-central Texas include a single specimen taken in Runnels County (Stangl et al., 1989) and five specimens from Fisher and Jones counties (Jones et al., 1991). No specimens have been taken in Coke County (Simpson and Maxwell, 1989) or Tom Green County.

DISCUSSION

The 53 species of mammals known from Tom Green County within the past 150 years include one didelphimorph marsupial, one xenarthran, two insectivores, eight chiropterans, 12 carnivores, four artiodactyls, 22 rodents, and three lagomorphs. Of these 53 species, we regard 48 as extant in the county. Five species (*C. lupus*, *A. americana*, *B. bison*, *C. ludovicianus*, *O. leucogaster*), 9 percent of the recent mammalian fauna, are now certainly or probably extirpated. Four species (*V. vulpes*, *M. musculus*, *R. rattus*, *M. coypus*) are introduced and persisting as wild populations in the county. We tentatively follow Jones et al. (1988) in regarding *V. vulpes* as introduced in the region from other North American populations.

The three extirpated herbivores (pronghorn, bison, black-tailed prairie dog) were members of the now greatly altered plains grassland ecosystem. Prior to the late 19th century, the rolling plain of west-central Texas, including Tom Green County, was vegetated predominantly in short and mid grasses with scattered mesquite and liveoak trees (Maxwell, 1979). Bailey (1899) described the San Angelo area after the alteration of vegetation had already begun, as follows: "San Angelo is on the open, mesquite plain in the genuinely arid region. There are great stretches of smooth surfaces with only short grass and little desert plants, but much of the

country is covered with a scattered growth of small mesquites." Increasing brush density was described by Oberholser (1901), who observed that the area around San Angelo that was not in cultivation was "covered with a growth of low chaparral." He noted that mesquite was "abundant almost everywhere." Grassland herbivores certainly declined in part as a consequence of persecution, but loss of their open grassland habitat must have contributed to their loss.

Analysis of mammalian habitat associations includes 41 of the 48 extant species. Five species (*L. noctivagans*, *P. hesperus*, *P. subflavus*, *P. concolor*, *S. audubonii*) are excluded because of too few records, and two species (*M. musculus*, *R. rattus*) are dependent on human alteration of natural habitats.

We regard nine species (*C. parva*, *S. putorius*, *T. taxus*, *S. mexicanus*, *C. hispidus*, *P. merriami*, *N. micropus*, *P. maniculatus*, *R. montanus*) primarily as mesquite-grassland inhabitants. Four species (*T. bottae*, *N. albigula*, *P. attwateri*, *P. pectoralis*) are primarily confined to juniper-liveoak upland. Eight species (*D. novemcinctus*, *L. borealis*, *L. cinereus*, *M. velifer*, *N. humeralis*, *S. niger*, *C. canadensis*, *M. coypus*) are primarily encountered in riparian situations. Fifteen species (*D. virginiana*, *N. crawfordi*, *T. brasiliensis*, *C. latrans*, *U. cinereoargenteus*, *V. vulpes*, *L. rufus*, *C. mesoleucus*, *M. mephitis*, *P. lotor*, *P. taylori*, *O. virginianus*, *B. taylori*, *P. leucopus*, *E. dorsatum*) are near equally present in all three primary mammalian habitats. Five species are equally common in two habitats. *B. astutus* and *S. variegatus* are found in juniper-liveoak upland and riparian. *S. hispidus* and *S. floridanus* occur primarily in mesquite-grassland and riparian. *L. californicus* is found in mesquite-grassland and juniper-liveoak upland.

The zoogeographic affinities of the county mammalian fauna, slightly (50 miles) northwest of the geographic center of the state are more with widespread and southwestern species. Forty-eight native species, including four that are extirpated, were compared to the faunal geographic patterns described by Davis and Schmidly (1994). Twenty-one species (44 percent of the county fauna) are widespread in Texas. Twenty species (42 percent) are western and southern in origin, although 50 (71 percent) of 70 Texas species in this

category do not reach the county. Seven of these missing western and southern species (*V. velox*, *O. hemionus*, *A. interpres*, *S. spilosoma*, *P. castanops*, *D. merriami*, *D. ordii*) occur in nearby Concho Valley counties. Only one (*P. attwateri*) of the eight classified strictly as plains species reaches south to the county.

Six species (12 percent) are primarily eastern in distribution. Three of these species (*C. parva*, *P. subflavus*, *N. humeralis*) are presumed rare in the county. Only three (*D. novemcinctus*, *S. niger*, *B. taylori*) of the 29 primarily eastern species in Texas are common in the county. The armadillo and pygmy mouse are 20th century arrivals to the region (Davis and Schmidly, 1994; Choate et al., 1990), having increased slightly the eastern component to the county's mammalian fauna.

Of particular interest are the distribution patterns of three species groups (woodland Chiroptera, Geomyidae, and *Sylvilagus*) present or absent in Tom Green County. Dense and near-continuous stands of pecan trees form a narrow riparian forest on the Concho River and its five major tributaries that converge at San Angelo. These pecan stands are most extensive near the permanent flow of springs at the heads of Concho River tributaries, such as Anson Springs on the South Concho River, 4-5 mi. south of Christoval. Urban tree plantings in San Angelo are extensive and have predominantly involved the same hydrophilic pecan.

Three of the eight bat species recorded (*L. borealis*, *L. cinereus*, *N. humeralis*) have been exclusively encountered in riparian and urban woodlands in this semiarid county. These three species, as well as *T. brasiliensis*, have been captured at the most-frequently netted location in the county (head of the South Concho River). These forests thin westward and reach their natural limits in adjacent Sterling and Irion counties. Three of these bat species are present in the breeding season. The attraction of these western outlying forests to bats is revealed by the record of a near-term pregnant *N. humeralis*, an eastern woodland bat. The location is well over 100 mi. west of previous known occurrences of this species (Dowler et al., 1992). The use of these forests, as habitats for forest-inhabiting vertebrates whose presence are more expected eastward in

Texas also has been documented for birds (Maxwell, 1979; Stephens, 1993).

Four species of pocket gophers (*T. bottae*, *G. bursarius*, *G. texensis*, *P. castanops*) occur in the Concho Valley region (Davis and Schmidly, 1994; Goetze and Jones, 1992; Hollander et al., 1987a; Thornton and Creel, 1975), but only *T. bottae* has been found in Tom Green County. *Thomomys* largely is restricted to shallow rocky soils on limestone uplands in this region. Although this pocket gopher has not been found in apparently suitable sites along the northern border of the county, it is known from the northwest and southern limestone uplands.

The extensive outwash plains and floodplains in this county, curiously, are devoid of pocket gophers and apparently have been so for all this century (Bailey, 1899, 1918). *G. bursarius* and *P. castanops* would seem to be candidate species for occupying these deep-soiled plains. *G. bursarius* prefers sandy soils (Goetze and Jones, 1992) and is common about 50 mi. north of the county. A nearer Coke County population found in 1971 (Thornton and Creel, 1975) cannot be relocated, despite two independent efforts (Simpson and Maxwell, 1989; Goetze and Jones, 1992). A well-known isolated population near Ballinger, Runnels County, has been thoroughly examined (Bailey, 1918; Thornton and Creel, 1975; Goetze and Jones, 1992). The deep sand habitat at that site does not extend westward into Tom Green County, and the specimen reported from Tom Green County (Davis and Schmidly, 1994) was actually taken at the Ballinger site in Runnels County.

P. castanops, in the absence of *Geomys*, occupies deep soils ranging from sandy loams to calcareous clays and clay loams (Goetze and Jones, 1992). Calcareous clay loams are the dominant soils of Tom Green County plains and yet *Pappogeomys* is not known to approach closer than about 20 mi. to the west, in Sterling and Irion counties (Thornton and Creel, 1975). Bailey (1918) believed, but did not confirm, that this pocket gopher was present in the valley of the South Concho River in either Tom Green or Schleicher county.

G. texensis is restricted to deep soils in the central mineral region (Davis and Schmidly, 1994) east of Tom Green County. The shallow upland soils between

the San Saba and Concho river drainages in Menard and Concho counties apparently are a barrier to the westward dispersal of this species.

The most recent delineation of the range of the desert cottontail (*S. audubonii*) in Texas (Davis and Schmidly, 1994) determined its probable distribution to include all of the western half of the Edwards Plateau. We are not aware of any investigation of the status of this rabbit in Central Texas. Specimens of *Sylvilagus* in the ASNHC from Tom Green and other Concho Valley counties indicate that *S. audubonii* is rare in most of the region. The majority of these records are of road kills along highways that traverse all of the mammalian habitats. The ASNHC contains 108 *Sylvilagus* specimens from Coke, Tom Green, Irion, and Reagan counties. Eight (7 percent) are *S. audubonii*, and 100 are *S. floridanus*. The desert cottontail apparently is more common in the Concho Valley west of Tom Green County. Only two (3 percent) of the 60 cottontails identified from Tom Green County are *S. audubonii*, but 5 (15 percent) of the 34 examined from Reagan County are of that species. Immediately north of these western counties in the southern reaches of the Llano Estacado, Choate et al. (1992) found this rabbit to be "considerably more common" than *S. floridanus*. The disparity in abundance of *S. audubonii* between these two adjacent regions suggests marked decline of suitable habitat within the short distance (about 60 mi.) from the Llano Estacado to the main body of Tom Green County.

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LITERATURE CITED

- Alexander, B. G. and R. L. Cook. 1992. Mountain lion roundtable; Del Rio, Texas; April 8-9, 1992. Unpublished rept., Wildlife Branch, Fisheries and Wildlife Div., Tex. Parks and Wildl. Dept., Austin.
- Austin, T. A. and J. A. Kitchens. 1986. Expansion of *Baiomys taylori* into Hardeman County, Texas. *Southwestern Nat.*, 31:547-548.
- Bailey, Vernon. 1899. Personal notes taken during trip from San Angelo to Big Spring dated 19 May to 23 May 1899. Smithsonian Institution Archives, Washington, D. C.
- . 1918. Personal notes on San Angelo region dated 18 March to 30 March 1918. Smithsonian Institution Archives, Washington, D. C.
- Blair, W. F. 1950. The biotic provinces of Texas. *Texas J. Sci.*, 2:93-117.
- . 1952. Bats of the Edwards Plateau in central Texas. *Texas J. Sci.*, 4:95-98.
- Boyd, R. A. 1994. The mammals of Tom Green County, Texas: distributions and natural history. Unpublished M. S. thesis. Angelo State Univ., San Angelo, Texas, 101 pp.
- Chasteen, N. B. 1975. Population characteristics and natural history of two species of *Perognathus* in southwestern Texas. Unpublished M. S. thesis. Angelo State Univ., San Angelo, Texas, 59 pp.
- Choate, L. L., J. K. Jones, Jr., R. W. Manning, and C. Jones. 1990. Westward ho: continued dispersal of the pygmy mouse, *Baiomys taylori*, on the Llano Estacado and in adjacent areas of Texas. *Occas. Papers Mus., Texas Tech Univ.*, 134:1-8.

- Choate, L. L., R. W. Manning, J. K. Jones, Jr., C. Jones, and T. R. Mollhagen. 1991. Records of mammals from the Llano Estacado and adjacent areas of Texas and New Mexico. *Occas. Papers Mus., Texas Tech Univ.*, 138:1-11.
- Choate, L. L., R. W. Manning, J. K. Jones, Jr., C. Jones, and S. E. Henke. 1992. Mammals from the southern border of the Kansan Biotic Province in western Texas. *Occas. Papers Mus., Texas Tech Univ.*, 152:1-34.
- Cleveland, A. G. 1986. First record of *Baiomys taylori* north of the Red River. *Southwestern Nat.*, 31:547.
- Creel, G. C. and W. A. Thornton. 1970. A note on the distributions and specific status of the fox genus *Vulpes* in west Texas. *Southwestern Nat.*, 15:402-404.
- Davis, W. B. 1974. The mammals of Texas. *Bull. Texas Parks Wildlife Dept., Austin, Texas*, 41:1-294.
- Davis, W. B. and D. J. Schmidly. 1994. The mammals of Texas. *Texas Parks Wildlife Dept., Austin, Texas*, 338 pp.
- Day, J. M. 1960. A preliminary guide to the study of buffalo trails in Texas. *West Texas Historical Association Year Book*, 36(2):137-155.
- Dowler, R. C. and R. A. Boyd. 1996. A range extension for the least shrew (*Cryptotis parva*) in west-central Texas. *Texas J. Sci.*, 48:168-170.
- Dowler, R. C., T. C. Maxwell, and D. S. Marsh. 1992. Noteworthy records of bats from Texas. *Texas J. Sci.*, 44:121-123.
- Dragoo, J. W., J. R. Choate, T. L. Yates, and T. P. O'Farrell. 1990. Evolutionary and taxonomic relationships among North American arid-land foxes. *J. Mamm.*, 71:318-332.
- Eckhardt, R. F. 1975. Vascular flora of Tom Green County, Texas. Unpublished M. S. thesis, Angelo State Univ., San Angelo, Texas, 123 pp.
- Engstrom, M. D. and T. C. Maxwell. 1988. Records of mountain lion (*Felis concolor*) from the western Edwards Plateau of Texas. *Texas J. Sci.*, 40:450-452.
- Etheredge, D. R. and M. D. Engstrom. 1991. Notes on reproduction of the white-ankled mouse, *Peromyscus pectoralis*, in west-central Texas. *Texas J. Sci.* 43:205-206.
- Etheredge, D. R., M. D. Engstrom, and R. C. Stone, Jr. 1989. Habitat discrimination between sympatric populations of *Peromyscus altwateri* and *Peromyscus pectoralis* in west-central Texas. *J. Mamm.*, 70:300-307.
- Goetze, J. R. and J. K. Jones, Jr. 1992. Comments on distribution and natural history of pocket gophers on the Rolling Plains of west-central Texas. *Occas. Papers Mus., Texas Tech Univ.*, 149:1-12.
- Hall, E. R. 1981. The mammals of North America. John Wiley and Sons, New York, 2nd ed. 1:1-600 and 2:601-1181.
- Hillman, C. N. and T. W. Clark. 1980. *Mustela nigripes*. Mammalian species, No. 26. The American Society of Mammalogists. Pp. 1-3.
- Hollander, R. R., C. Jones, R. W. Manning, and J. K. Jones, Jr. 1987a. Distributional notes on some mammals from the Edwards Plateau and adjacent areas of south-central Texas. *Occas. Papers Mus., Texas Tech Univ.*, 110:1-10.
- Hollander, R. R., J. K. Jones, Jr., R. W. Manning, and C. Jones. 1987b. Noteworthy records of mammals from the Texas Panhandle. *Texas J. Sci.* 39:97-102.
- Jensen, L. S. 1980. A morphological and cytogenetic comparison of species in the genus *Peromyscus* (Rodentia: Muridae) in Tom Green County, Texas. Unpublished M. S. thesis. Angelo State Univ., San Angelo, Texas, 88 pp.
- Jones, J. K., Jr. and C. Jones. 1992. Revised checklist of Recent land mammals of Texas, with annotations. *Texas J. Sci.*, 44:53-74.
- Jones, J. K., Jr., C. Jones, and D. J. Schmidly. 1988. Annotated checklist of Recent land mammals of Texas. *Occas. Papers Mus., Texas Tech Univ.*, 119:1-26.

- Jones, J. K., Jr., R. W. Manning, and J. R. Goetze. 1991. Noteworthy records of seven species of small mammals from west-central Texas. *Occas. Papers Mus., Texas Tech Univ.*, 143:1-4.
- Larkin, T. J. and G. W. Bomar. 1983. Climatic atlas of Texas. Texas Dept. of Water Resources. Austin, Texas, 151 pp.
- Lee, T. J., Jr. and M. D. Engstrom. 1991. Genetic variation in the silky pocket mouse (*Perognathus flavus*) in Texas and New Mexico. *J. Mamm.*, 72:273-285.
- Manning, R. W., J. K. Jones, Jr., and R. R. Hollander. 1986. Northern limits of distribution of the hog-nosed skunk, *Conepatus mesoleucus*, in Texas. *Texas J. Sci.*, 38:289-291.
- Manning, R. W., J. K. Jones, Jr., R. R. Hollander, and C. Jones. 1987. Notes on distribution and natural history of some bats on the Edwards Plateau and in adjacent areas of Texas. *Texas J. Sci.*, 39:279-285.
- Maxwell, T. C. 1979. Avifauna of the Concho Valley of west-central Texas with special reference to historical change. Unpublished Ph.D. dissertation. Texas A&M Univ., College Station, Texas, pp. 17-40.
- McMahan, C. A., R. G. Frye, and K. L. Brown. 1984. The vegetation types of Texas. Texas Parks and Wildlife Department, Austin. 40 pp. + map.
- Mercure, A., K. Ralls, K. P. Koepfli, and R. K. Wayne. 1993. Genetic subdivisions among small canids: mitochondrial DNA differentiation of swift, kit, and arctic foxes. *Evolution*, 47(5):1313-1328.
- Notson, W. M. 1974. Fort Concho Medical History: 1869-1872. Fort Concho Preservation and Museum, San Angelo, Texas, 61 pp.
- Oberholser, H. C. 1901. Personal notes taken during trip from San Angelo to Fort Lancaster dated 5 April to 9 April 1901. Smithsonian Institution Archives, Washington, D. C.
- Packard, R. L. and J. H. Bowers. 1970. Distributional notes on some foxes from western Texas and eastern New Mexico. *Southwestern Nat.*, 14:450-451.
- Schmidly, D. J. 1977. The mammals of Trans-Pecos Texas including Big Bend National Park and Guadalupe National Park. Texas A&M Univ. Press, College Station, Texas, 225 pp.
- Schmidly, D. J. 1983. Texas mammals east of the Balcones Fault Zone. Texas A&M Univ. Press, College Station, Texas, 400 pp.
- Schmidly, D. J. 1991. The bats of Texas. Texas A&M Univ. Press, College Station, Texas, 188 pp.
- Scott, R. F., IV, and D. Creel. 1990. Vertebrate faunal analysis. Pp. 165-208, in *Excavations at 41TG91 Tom Green County, Texas, 1978* (D. Creel). Publ. in *Archaeology*, Texas Dept. Highways and Public Transp., Austin, Report No. 38:329 pp.
- Shockley, T. L. 1974. Natural history of the Mexican ground squirrel, *Spermophilus mexicanus parvidens* (Mearns), in southwest Texas. Unpublished M. S. thesis, Angelo State Univ., San Angelo, Texas, 115 pp.
- Shultz, M. 1988. Hunter's frontier: exterminating the American bison in the Concho River region. Fort Concho Report, Fort Concho Museum, San Angelo, Texas, 20(1):1-32.
- Simpson, L. A. and T. C. Maxwell. 1989. The mammal fauna of Coke County, Texas. *Texas J. Sci.*, 41:177-192.
- Smith, P. A. 1992. Population ecology of the nine-banded armadillo (*Dasypus novemcinctus*) in west-central Texas. Unpublished M.S. thesis, Angelo State Univ., San Angelo, Texas, 32 pp.
- Stangl, F. B., Jr., S. Kasper, and T. S. Schafer. 1989. Noteworthy range extensions and marginal distributional records for five species of Texas mammals. *Texas J. Sci.* 41:436-437.
- Stangl, F. B., Jr., B. F. Koop, and C.S. Hood. 1983. Occurrence of *Baiomys taylori* (Rodentia: Cricetidae) on the Texas High Plains. *Occas. Papers Mus., Texas Tech Univ.*, 85:1-4.

- Stephens, R. C. 1993. Importance of wooded habitats to Neotropical migrant breeding birds in the Concho Valley, western Edwards Plateau, Texas. Unpublished M. S. thesis, Angelo State Univ., San Angelo, 31 pp.
- Thornton, M. L. and T. E. Lee, Jr. 1996. Distributional records of three mammals from the Rolling Plains of central Texas. *Texas J. Sci.* 48(4):331-332.
- Thornton, W. A. and G. C. Creel. 1975. Distribution of gophers (Geomyidae) in western Texas. *Southwestern Nat.* 20:272-275.
- Wiedenfeld, C. C. and P. H. Flores. 1976. Soil survey of Tom Green County, Texas. National Cooperative Soil Survey, Soil Conservation Service, United States Department of Agriculture. 58 pp.
- Wilson, D. E. and D. M. Reeder (eds.). 1993. Mammal species of the world: a taxonomic and geographic reference. 2nd edition. Smithsonian Institution, Washington, D. C., 1206 pp.
- Yancey, F. D., II and C. Jones. 1996. New county records for ten species of bats (Vespertilionidae and Molossidae) from Texas. *Texas J. Sci.* 48(2):137-142.
- Yancey, F. D., II, C. Jones, and R. W. Manning. 1995. The eastern pipistrelle, *Pipistrellus subflavus* (Chiroptera: Vespertilionidae), from the Big Bend region of Texas. *Texas J. Sci.* 47(3): 229-231.

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It was through the efforts of Horn Professor J Knox Jones, as director of Academic Publications, that Texas Tech University initiated several publications series including the Occasional Papers of the Museum. This and future editions in the series are a memorial to his dedication to excellence in academic publications. Professor Jones enjoyed editing scientific publications and served the scientific community as an editor for the Journal of Mammalogy, Evolution, The Texas Journal of Science, Occasional Papers of the Museum, and Special Publications of the Museum. It is with special fondness that we remember Dr. J Knox Jones.

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